

## TUMOR OF THE CAUDA EQUINA REMOVED BY OPERATION: RECOVERY.

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TUMORS within the spinal canal are of sufficient rarity to justify the publication of the present case. It presented to the surgeon some points of interest and some difficulties in the matter of diagnosis and to the patient the not unimportant one of complete recovery.

Mrs. W., æt. 45, a widow. Personal and family history good. Complained of pain (sciatica, she called it) in both legs, lasting for at least four years. The pain began in the right leg about the middle of the back of the thigh, and "the painful area could at first be covered with the thumb." The pain was constant and of a gnawing character. She could not bear to sit squarely on a chair, owing to the pain, and had to sit on the edge so as to prevent the chair from pressing on the back of the thigh. Although the pain was constant it varied in intensity, was always worse after exertion, and frequently at night was so severe as to preclude all possibility of sleep. During the last two years the pain has become so severe as to almost completely incapacitate her from carrying on her ordinary household duties. During this time the only position of comparative comfort was lying curled up in bed. When she stood upright the pain rapidly became so severe that she was unable to remain erect, but on lying down again the pain would gradually diminish to its usual degree of intensity.

During these years the patient underwent various forms of treatment and consulted many medical men, her case being looked upon and diagnosed differently by each one who saw her. She was treated in a London hospital as a case of sciatica and had the sciatic nerves dry-stretched; she also underwent a course of electrical treatment, both galvanic and faradic, and, at a later date, in another hospital, a course of treatment with the high-

frequency currents. She was sounded for stone and had the cautery applied to the backs of the thighs. At a later date she was treated with rest and splints in a modified Weir-Mitchell treatment.

Although the pain began in the right leg, it was when I first saw the patient worse in the left leg.

*Physical examination.*—The first thing which struck one on looking at the patient was the wasting of the muscles of the buttocks and of the lower limbs. The gluteus maximus on both sides was wasted, soft, and flabby; so that the normal contour of the buttocks was lost. The hamstrings and ischial portion of the adductor magnus were wasted and flabby. The calf-muscles were so reduced in size that all appearance of calf was lost and the anterior tibial muscles were atrophied. The quadriceps extensors, though reduced in size, had not lost their contour and the adductors were not obviously affected.

The knees could not be straightened and the patient could not stand without support. There was no obvious wasting of the quadriceps extensor in either leg nor of the adductors. Although there was weakness of the wasted muscles, there was no paralysis. The knee-jerks were not altered; there was no clonus, and the plantar reflex was diminished.

The measurements of the two limbs showed that they were much smaller than would be expected in a person of that build, and the left was three-quarters of an inch less than the right all the way down. There were no tender points to be made out and the tactile and pain sensations were relatively diminished as compared with the front of the thighs, as also was the sensation of heat and cold. The skin showed no obvious change and there was no zone of hyperæsthesia either in the trunk or limbs.

There was pain on deep percussion over the lower lumbar region and pain was felt in the same place when the patient stood for a few minutes or bent forwards. There was no deformity of the spine and no evidence of sacro-iliac disease. The bowels were constipated and she did not pass water oftener than once in the twenty-four hours.

The salient points of the case were: 1. Pain in the back and along the course of the sciatic nerves. 2. Wasting of the glutei maximi muscles and all the muscles supplied by the great sciatic nerves. 3. Pain on deep percussion, on bending forward

and on standing in the erect position, the pain being felt in the lower lumbar region and radiating along the course of the sciatic nerves. The pain was constant and had been existant for at least four years, and the atrophy of muscles had been observed for at least two years.

Differential diagnosis.

Sciatica was negatived by both sides being affected and by the disease not being limited to the sciatic nerves; for the condition of the gluteus maximus clearly showed that the inferior gluteal nerve, at least, was involved and sciatica could not account for the pain in the back.

Neuritis was negatived by the extent of the lesion, its duration, the absence of paralysis and the causes which produce that disease.

Pressure on nerves from disease of the sacro-iliac joints was negatived by the extent of the lesions, its bilateral condition. It was impossible to conceive disease of both joints about the same age producing pressure in almost exactly the same place and to almost exactly the same degree; besides, there was no evidence of disease of the sacro-iliac joints or any other disease in the pelvis.

Finally we are brought down to the spinal canal. Pressure in the spinal canal could produce all the symptoms, and that, too, with a comparatively small lesion. If we look at the condition of the patient for a moment it will be obvious that the lesion from which she suffered was one that involved the fifth lumbar nerve and all the nerves below that level on both sides of the body. That the fifth lumbar nerve was involved was proved by the condition of the gluteus maximus, which it will be remembered is supplied by the inferior gluteal nerve derived from the fifth lumbar and first and second sacral nerves, and that all the nerves below that point were involved was proved by all the muscles supplied by the great sciatic nerve being wasted and by the retention of urine.

Pain was the first symptom and was constant throughout the disease; later wasting and muscular weakness supervened. A lesion in the spinal canal would account for all the symptoms, and such a lesion might be due to: a. Disease of the spine-caries, or b. Tumor in the canal.

The lesion in this case, because of the symptoms and progress, must obviously be situated on the posterior aspect of the

canal; so as to produce pain first and weakness and wasting later. And as caries of the spine practically always attacks the bodies and not the laminae, and as there was no evidence of disease of the spine, the spine was excluded. The question of an exostosis on a lamina was put out of account because it seemed impossible that pressure by a hard rigid body could have existed so long and not have produced paralysis. The lesion, it was felt, must be soft because of the absence of paralysis.

Finally the question to decide was, is this a lesion of the cord or of the cauda equina?

A tumor, pressing on the posterior aspect of the spinal cord, must have destroyed the posterior region of the cord before it could have produced weakness and wasting. Moreover the tumor must have been a long one to catch all the roots from the fifth lumbar downwards and this would have meant the abolition of the reflexes and loss of sensation. If, on the other hand, the tumor had not extended over the whole region of these roots, but had been situated over the fifth lumbar segment, then the reflexes below that segment would have been increased by the lower centres being cut off from those above. For these reasons the cord was excluded and finally we come to the cauda equina.

Pressure at the level of the fifth lumbar vertebra would catch the fifth lumbar roots and all the roots below that point. It would catch the posterior roots first and then through them the anterior roots.

Finally we arrive at the diagnosis that the patient is suffering from a tumor in the spinal canal at the level of the fifth lumbar vertebra, that it is soft and probably non-malignant.

Operation January 12, 1907. The spinal canal was opened in the usual manner and the dura mater exposed, and a zone of thickened and congested dura brought to view at the level of the upper border of the fifth lumbar vertebra. On opening the theca an encapsulated tumor was found extending along the body of the fifth lumbar vertebra and into the upper part of the sacral canal for the matter of half an inch. The growth was easily shelled out without injury to the nerve roots. These were all found to be pressed forward against the vertebral body except one, which was pressed against the postero-lateral wall of the subdural space on the left side. After removal of the tumor the edges of the theca were drawn together with a continuous suture

and the rest of the wound closed in the usual manner, deep sutures being used to approximate the muscles and close in the space. The wound healed by first intention and the after-treatment presented no special features of interest. A catheter was passed three times daily after the operation for the first ten days, so as to avoid any possibility of the dressings becoming soiled and the wound thereby infected. After that time it is interesting to note that the patient voided urine naturally and the usual number of times in the twenty-four hours; in fact, that the retention which she had had so long ceased.

For some weeks the patient complained of pain in the old positions, but notwithstanding this she slept well and her limbs began to grow. Seen May 25, 1907, she expressed herself as quite well; she is able to walk two miles without a rest; attends to her ordinary household duties and her garden, in which she is much interested. She has gained considerably in weight, and the limbs have grown till they present quite normal proportions. The actual measurements of the two limbs before and after the operation are as stated below:

BEFORE OPERATION		
	Right	Left
Thigh.....	16 $\frac{7}{8}$ "	16 $\frac{3}{8}$ "
Calf.....	12 $\frac{3}{4}$ "	11 $\frac{7}{8}$ "

AFTER OPERATION, May 25th, 1907		
	Right	Left
Thigh.....	21 $\frac{1}{4}$ "	21 $\frac{1}{4}$ "
Calf.....	14 $\frac{3}{8}$ "	13 $\frac{3}{4}$ "

The pathological report stated that the tumor was fibromuscular, with large vessels, but no trace of malignancy.